

An HI survey of the Boötes void. II. The Analysis

Arpad Szomoru ^{*} J. H. van Gorkom [†] Michael D. Gregg [‡]

Michael A. Strauss [§]

Abstract

We discuss the results of a VLA ¹ (Napier et al. 1983) HI survey of the Boötes void and compare the distribution and HI properties of the void galaxies to those of galaxies found in a survey of regions of mean cosmic density. The Boötes survey covers 1100 Mpc³, or $\sim 1\%$ of the volume of the void and consists of 24 cubes of typically 2 Mpc \times 2 Mpc \times 1280 km s⁻¹, centered on optically known galaxies. Sixteen targets were detected in HI; 18 previously uncataloged objects were discovered directly in HI. The control sample consists of 12 cubes centered on *IRAS* selected galaxies with FIR luminosities similar to those of the Boötes targets and located in regions of 1 to 2 times the cosmic mean density. In addition to the 12 targets 29 companions were detected in HI. We find that the number of galaxies within 1 Mpc of the targets is the same to within a factor of two for void and control samples, and thus that the small scale clustering of galaxies is the same in regions that differ by a factor of ~ 6 in density on larger scales.

A dynamical analysis of the galaxies in the void suggests that on scales of a few Mpc the galaxies are gravitationally bound, forming interacting galaxy pairs, loose pairs and loose groups. One group is compact enough to qualify as a Hickson compact group (hereafter HCG) (Hickson 1982).

The galaxies found in the void are mostly late-type, gas rich systems. A careful scrutiny of their HI and optical properties shows them to be very similar to field galaxies of the same morphological type. This, combined with our finding that the small scale clustering of the galaxies in the void is the same as in the field, suggests that it is the near environment that mostly affects the evolution of galaxies.

^{*}Kapteyn Astronomical Institute, P.O. Box 800, NL 9700 AV Groningen, The Netherlands, Visiting Astronomer, Kitt Peak National Observatory, National Optical Astronomy Observatory

[†]Columbia University, 538 W 120th Street, New York NY 10027, USA

[‡]Institute of Geophysics and Planetary Physics, Lawrence Livermore National Laboratory, P.O. Box 808, L-413 Livermore, CA 94551-9900, USA, Visiting Astronomer, Kitt Peak National Observatory, National Optical Astronomy Observatory

[§]Princeton University Obs., Peyton Hall, Princeton, NJ 08544, USA

¹The NRAO is operated by Associated Universities, Inc., under a cooperative agreement with the National Science Foundation.